Linnéuniversitetet
Kalmar Växjö

Report

Assignment 3

1DV701

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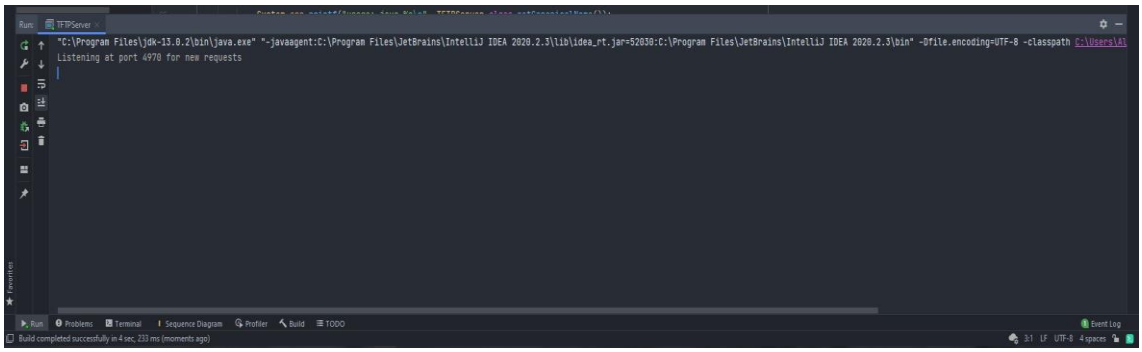
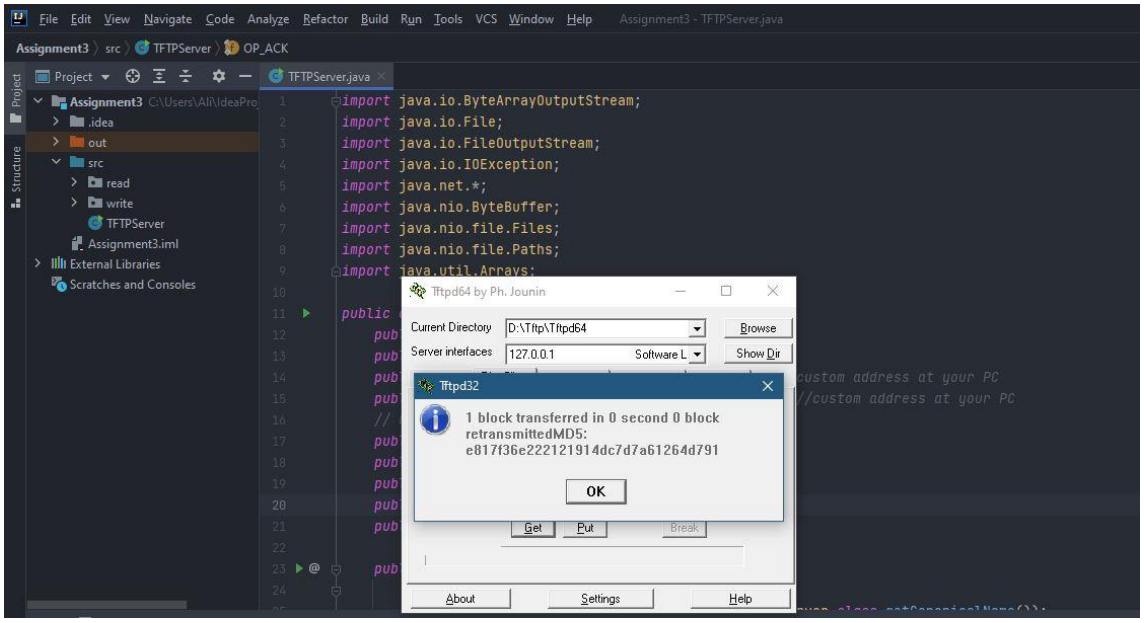
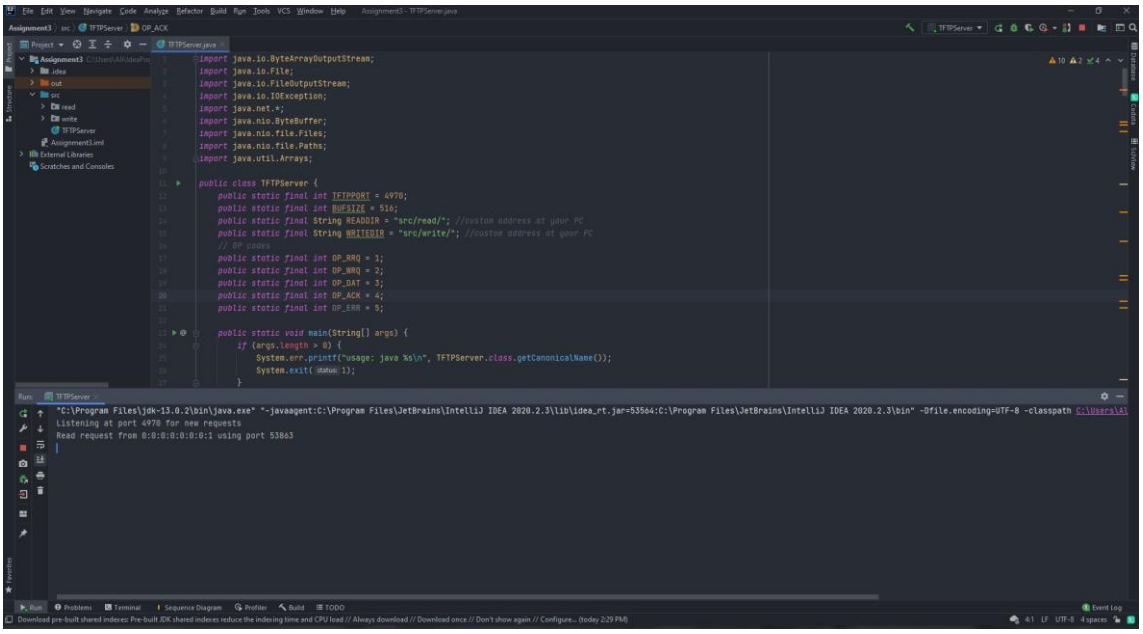
Contents

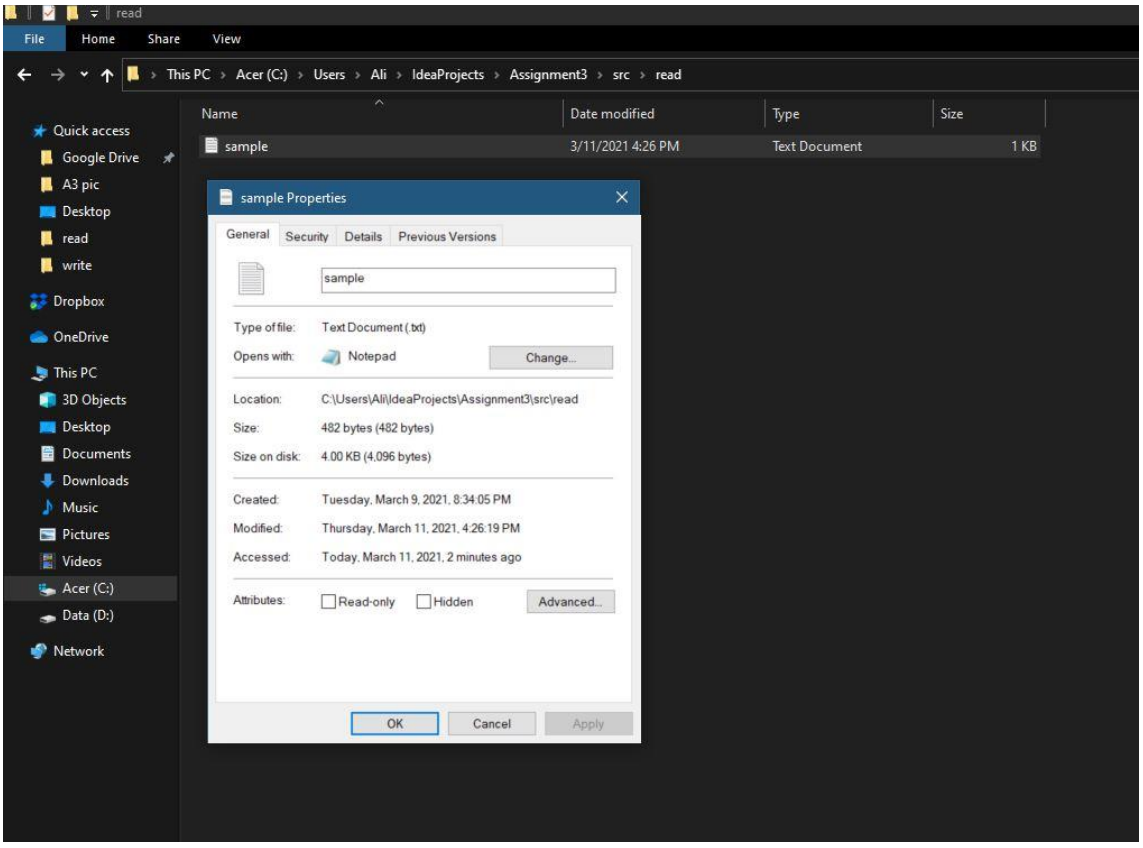
1 Problem 1

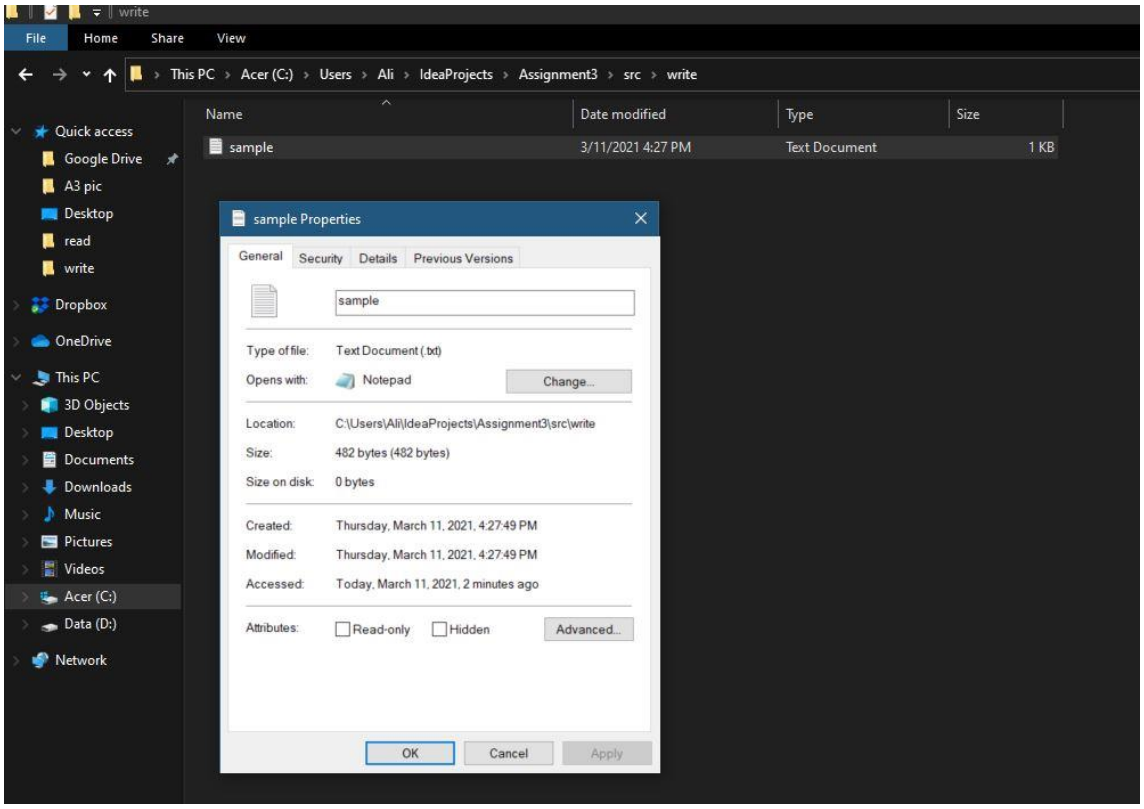
```java
public class TFTPServer {
    public static final int TFTPPORT = 4970;
    public static final int BUFSIZE = 516;
    public static final String READDIR = "src/read/"; //custom address at your PC
    public static final String WRITEDIR = "src/write/"; //custom address at your PC
    // OP codes
    public static final int OP_RRQ = 1;
    public static final int OP_WRQ = 2;
    public static final int OP_DAT = 3;
    public static final int OP_ACK = 4;
    public static final int OP_ERR = 5;
```

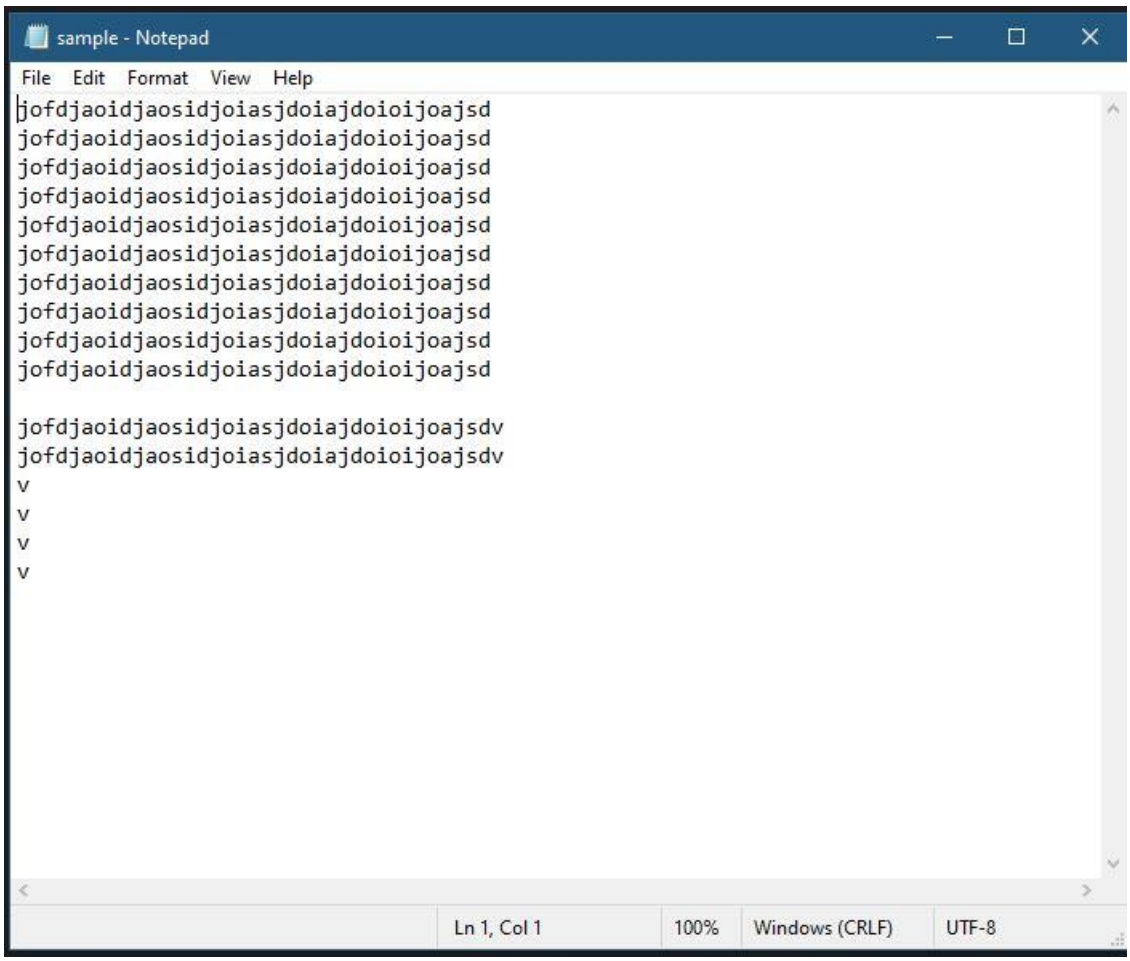





import java.io.ByteArrayOutputStream;
import java.io.File;
import java.io.FileOutputStream;
import java.io.IOException;
import java.net.*;
import java.nio.ByteBuffer;
import java.nio.file.Files;
import java.nio.file.Paths;
import java.util.Arrays;
public class TFTPServer {
public static final int TFTPPORT = 4970;
public static final int BUFSIZE = 516;
public static final String READDIR = "src/read/"; //custom address at your PC
public static final String WRITEDIR = "src/write/"; //custom address at your PC
// OP codes
public static final int OP_RRQ = 1;
public static final int OP_WRQ = 2;
public static final int OP_DAT = 3;
public static final int OP_ACK = 4;
public static final int OP_ERR = 5;
public static void main(String[] args) {
if (args.length > 0) {
System.err.printf("usage: java %s\n", TFTPServer.class.getCanonicalName());
System.exit(1);
}
"C:\Program Files\jdk-13.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA 2020.2.3\lib\idea_rt.jar=53564:C:\Program Files\JetBrains\IntelliJ IDEA 2020.2.3\bin" -Dfile.encoding=UTF-8 -classpath
Listening at port 4970 for new requests
Read request from 0:0:0:0:0:0:0:1 using port 53863


read
File
Home
Share
View
This PC
Acer (C:)
Users
Ali
IdeaProjects
Assignment3
src
read
Quick access
Google Drive
A3 pic
Desktop
read
write
Dropbox
OneDrive
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Acer (C:)
Data (D:)
Network
Name
Date modified
Type
Size
sample
3/11/2021 4:26 PM
Text Document
1 KB
sample Properties
General
Security
Details
Previous Versions
sample
Type of file:
Text Document (.txt)
Opens with:
Notepad
Change...
Location:
C:\Users\Ali\IdeaProjects\Assignment3\src\read
Size:
482 bytes (482 bytes)
Size on disk:
4.00 KB (4.096 bytes)
Created:
Tuesday, March 9, 2021, 8:34:05 PM
Modified:
Thursday, March 11, 2021, 4:26:19 PM
Accessed:
Today, March 11, 2021, 2 minutes ago
Attributes:
Read-only
Hidden
Advanced...
OK
Cancel
Apply


write
File
Home
Share
View
This PC › Acer (C:) › Users › Ali › IdeaProjects › Assignment3 › src › write
Quick access
Google Drive
A3 pic
Desktop
read
write
Dropbox
OneDrive
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Acer (C:)
Data (D:)
Network
Name
Date modified
Type
Size
sample
3/11/2021 4:27 PM
Text Document
1 KB
sample Properties
General
Security
Details
Previous Versions
sample
Type of file:
Text Document (.txt)
Opens with:
Notepad
Change...
Location:
C:\Users\Ali\IdeaProjects\Assignment3\src\write
Size:
482 bytes (482 bytes)
Size on disk:
0 bytes
Created:
Thursday, March 11, 2021, 4:27:49 PM
Modified:
Thursday, March 11, 2021, 4:27:49 PM
Accessed:
Today, March 11, 2021, 2 minutes ago
Attributes:
Read-only
Hidden
Advanced...
OK
Cancel
Apply


sample - Notepad
File Edit Format View Help
jofdjaoidjaosidjoiasjdoiajdoioijoajsd
jofdjaoidjaosidjoiasjdoiajdoioijoajsd
jofdjaoidjaosidjoiasjdoiajdoioijoajsd
jofdjaoidjaosidjoiasjdoiajdoioijoajsd
jofdjaoidjaosidjoiasjdoiajdoioijoajsd
jofdjaoidjaosidjoiasjdoiajdoioijoajsd
jofdjaoidjaosidjoiasjdoiajdoioijoajsd
jofdjaoidjaosidjoiasjdoiajdoioijoajsd
jofdjaoidjaosidjoiasjdoiajdoioijoajsd
jofdjaoidjaosidjoiasjdoiajdoioijoajsd
jofdjaoidjaosidjoiasjdoiajdoioijoajsd
jofdjaoidjaosidjoiasjdoiajdoioijoajsdv
jofdjaoidjaosidjoiasjdoiajdoioijoajsdv
v
v
v
v
Ln 1, Col 1
100%
Windows (CRLF)
UTF-8

1.1 Discussion

As it was asked to implement a TFTP server based on the RFC1350, after finishing the implementation, the TFTP starter code now can handle a single read request.

Based on the provided screenshots, a text file named sample has been created in the read folder which is located in the src folder. Consequently, after the execution of the server, by using the provided application named tftpd64 and specifying the required information such as port, localhost, and local file, we will do a get request. As a result, an identical text file in the write folder will be created holding the same data and size. In our case, the file that has been used in the above screenshots is 482 bytes.

Regarding using the usage of the socket and send socket, the idea of taking advantage of them is that the first socket is required to create a connection. On the other hand, the other socket has the responsibility of transferring packets between client and server. What I mean by this is, since the socket is used for listening, once the client has been connected, a new connection will be established for the client.

To tackle this issue we had to make sure about our first goal which was forming a connection then acknowledge a request from the client. Therefore, the bytes were required to be given to an integer. For example, a part of implementation is about proceeding with two bytes then it will initiate with the greatest byte and shifting them to the left. Consequently, it will result in a higher speed.

```
if (packet1.getPort() == port) {
    int op_code = ParseRQ(obtain, null);
    if (op_code == OP_ACK) return ((obtain[2] << 8) | (obtain[3] &
0x00ff));
    else return -1;
} else {
    return -2;
}
```

Also, ByteBuffer for allocating space, adding, and converting the bytes has been used in the implementation.

```
ByteBuffer allocate = ByteBuffer.allocate(4);
allocate.putShort((short) OP_ACK);
allocate.putShort((short) block);
byte[] acknowledgement = (allocate.array());
```

In the first if condition the last part simply means that it will eliminate the greater bits.

```
| (obtain[3] & 0x00ff));
```

Some simple error handling was covered as well. That is, error messages such as the file already exist or the file was not found.

```
File file = new File(requestedFile);
if (opcode == OP_RRQ) {

    if(!(file.exists() && file.isFile())) {
        System.out.println("The File was not found");

    }
```

```
} else if (opcode == OP_WRQ) {
    if (file.exists() && file.isFile()) {
        System.err.println("The file exists already");
    }
```

All in all, in the implementation, Datagrampacket has been used. The DatagramPacket is for establishing a connectionless packet delivery service. In our case, two parameters have been added to the signature that is DatagramSocket and byte array.

```
private int send_DATA_receive_ACK(DatagramSocket socket, byte[] bytes,
int port) {
    DatagramPacket packet = new DatagramPacket(bytes, bytes.length);
```

```
private int receive_DATA_send_ACK(DatagramSocket socket, byte[]
acknowledge, ByteArrayOutputStream takeNote, int port) {
    try {
        socket.send(new DatagramPacket(acknowledge,
acknowledge.length));
        byte[] bytes = new byte[512 + 4];
        DatagramPacket packet = new DatagramPacket(bytes,
bytes.length);
        socket.receive(packet);
```

Eventually, the DatagramSocket will send the packet and it will receive it afterward.

2 Work Distribution

For this assignment, we have worked together for the second time. Therefore, everything went smoothly. What I mean by this is that both members have dedicated their time to this assignment equally. As a result, each member has done 50% of the job. To be more specific, since at the beginning we were studying the resources we were almost sharing the same idea when we were working on the code. Also, each member was required to take responsibility for some parts of the implementation.

For example, the below work has been split between the members and was combined once they were done.

```
public static final int OP_RRQ = 1;
public static final int OP_WRQ = 2;
public static final int OP_DAT = 3;
public static final int OP_ACK = 4;
```

If one of the members were stuck on a particular problem, by consulting with the other member the problem would have been solved. After each member has contributed their parts, the final work eventually has been prepared.

Moving on, as usual, both members were consulted with each other for writing the report.

3 Problem 2

Place your screenshots here

3.1 Discussion

3.2 VG 1

Place your screenshots here

3.2.1 Discussion

4 Problem 3

Place your screenshots here

4.1 Discussion

4.2 VG 2

Place your screenshots here

4.2.1 Discussion